

*A Finely Crafted O'Brien Unit 3 Test*

**Technology Aided Section:** You may use a calculator or applications on your laptop- **no internet or notes**. Use a pencil. Show all work and circle your answer. Use your time wisely; you will be able to earn additional credit after the timed portion of the test by completing Supercorrections. When you finish, you can come up to get the non-technology part—you may continue to work on both sections without the aid of technology.

1. Go to the ThatQuiz link on the class website and do the problem there.

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2. Solve this system using any method that you like.

$$\begin{cases} y = 3x + 1 \\ y = -x + 5 \end{cases}$$

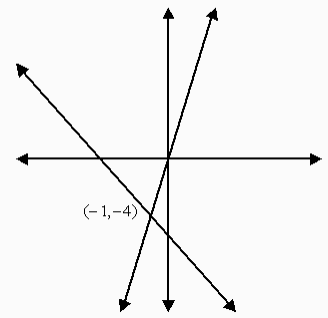
3. Solve the system using the Elimination Method.

$$\begin{cases} 5x + 2y = 24 \\ 2x - 12 = 4y \end{cases}$$

4. Solve the system using the Substitution Method.

$$\begin{cases} x + y + z = 7 \\ 2x + 3y = 3 \\ x = -2y \end{cases}$$

5. Write a system of equations that could possibly be represented by the graph at right.



6. Write a linear inequality that, when taken with  $y > x + 6$ , forms a system of linear inequalities whose solution is the empty set (i.e. has no solution).

7. Robin claims that there is some value for  $a$  for which the system of linear equations below has no solution.

$$2x - 5y = 8$$

$$3x - 6y = a$$

Sam disagrees and claims that there will be a solution for the system regardless of the value of  $a$ . Who is correct and why?

8. Consider  $f(x) = 4x^2 - 3x + 6$ . Evaluate.

a.  $f(-2)$

b.  $f(0)$

c.  $f(2)$

9. Let  $f(x) = 3x + 2$  and  $g(x) = x - 5$ . Find:

a.  $f + g$

b.  $f \cdot g$

c.  $(g \circ f)(3)$

d.  $(f \circ g)(7)$

# NON TECHNOLOGY SECTION

Name: \_\_\_\_\_

10. Miss Take is trying to solve this system:

$$\begin{cases} 7x - 3y = 4 \\ y = 2x + 1 \end{cases}$$

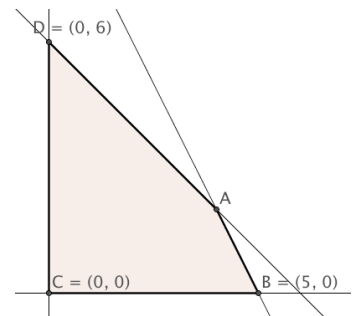
She uses the Substitution Method, and here is her working:

$$\begin{aligned} 7x - 3(2x + 1) &= 4 \\ 7x - 6x + 3 &= 4 \\ x + 3 &= 4 \\ \boxed{x = 1} \end{aligned} \quad \begin{aligned} \text{So, } y &= 2(1) + 1 \\ \boxed{y = 3} \end{aligned}$$

Check her answer to see if it works. If it doesn't, **circle** the mistake in her working (no need to solve again).

11. Bailey is doing a linear programming problem, and he is trying to maximize the objective function  $P = 2x + y$ . He graphs the constraints at right.

a. Use algebra to find the coordinates of A.



b. Find the maximum value of the objective function.

Constraints:

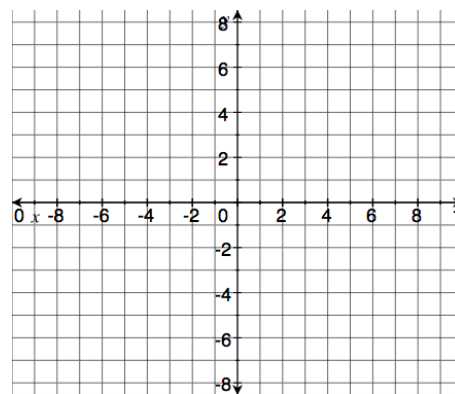
$$\begin{cases} x + y = 6 \\ 2x + y = 10 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

12. Find an equation for the inverse.

$$f(x) = \frac{5x - 3}{7}$$

13. Graph the pair of parametric equations and then write them as a single equation in  $x$  and  $y$ .

$$\begin{cases} x(t) = 3t \\ y(t) = -2t + 3 \end{cases} \text{ for } -3 \leq t \leq 3$$



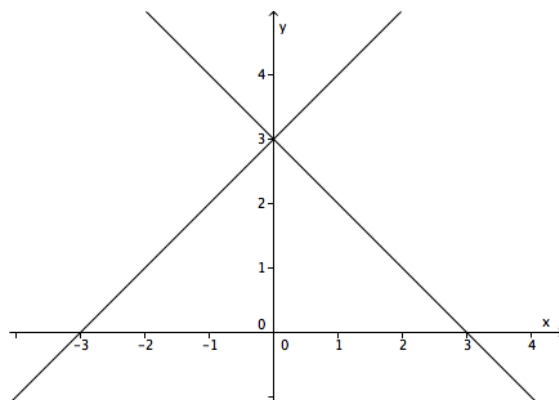
14. Sierra needs to graph the system  $\begin{cases} y - x \leq 3 \\ y + x \geq 3 \end{cases}$ . She has done the first step by graphing the system of **equations**

$$\begin{cases} y - x = 3 \\ y + x = 3 \end{cases} \text{ at right.}$$

a. Finish Sierra's work by shading the correct part of the graph.

b. Choose a point  $(x, y)$  from the shaded region and

shows that it works in the system  $\begin{cases} y - x \leq 3 \\ y + x \geq 3 \end{cases}$ .



*Go back and check your answers- the fewer Supercorrections, the better!*